

What is claimed is:

1. A process for continuously hydrocyanating 1,3-butadiene in the presence of at least one nickel(0) catalyst having chelate ligands, which comprises using 1,3-butadiene and hydrogen cyanide in a molar ratio of from 1.6:1 to 1.1:1.
2. The process according to claim 1, wherein the continuous hydrocyanation is additionally carried out in the presence of at least one Lewis acid.
3. The process according to claim 1 or 2, characterized by the following process steps:
 - (a) continuously hydrocyanating 1,3-butadiene in the presence of at least one nickel(0) catalyst having chelate ligands and, if appropriate, in the presence of at least one Lewis acid, 1,3-butadiene and hydrogen cyanide being used in a molar ratio of from 1.6:1 to 1.1:1 to obtain a mixture 1 which comprises 3-pentenenitrile and 2-methyl-3-butenitrile;
 - (c) continuously isomerizing 2-methyl-3-butenitrile which is present in the mixture 1 over at least one dissolved or dispersed isomerization catalyst to give 3-pentenenitrile, resulting in a mixture 2.
4. The process according to claim 3, wherein the 3-pentenenitrile obtained in process step (c) is hydrocyanated in the presence of at least one nickel(0) catalyst having phosphorus ligands.
5. The process according to claim 3 or 4, wherein the isomerization in process step (c) is effected by heating the mixture 1 to from 80 to 125°C.
6. The process according to any of claims 3 to 5, wherein the continuous isomerization carried out in process step (c) is carried out in the presence of at least one Lewis acid.
7. The process according to any of claims 3 to 6, wherein, between process step (a) and process step (c), the following process step (b) is run through:
 - (b) distillatively removing 1,3-butadiene from the mixture 1.
8. The process according to any of claims 3 to 7, wherein the isomerization catalyst used in process step (c) is the nickel(0) catalyst having chelate ligands used in process step (a).
9. The process according to any of claims 1 to 8, wherein the nickel(0) catalyst is

saturated with phosphorus chelate ligands, the phosphorus chelate ligands being selected from the group consisting of bidentate phosphites, phosphines, phosphonites, phosphinites and phosphinite phosphites.